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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/853,467	05/11/2001	Terry Lee Bray	30705-68918	6692

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EXAMINER	
SONG, MATTHEW J	

ART UNIT	PAPER NUMBER
1765	

DATE MAILED: 05/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Application No.	Applicant(s)
09/853,467	BRAY, TERRY LEE
Examiner	**Art Unit**
Matthew J Song	1765

Office Action Summary

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 March 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4,5 and 14-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 2, 4, 5, and 14-41* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-2, 4-5, 14-23 and 27-31, 36-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heilig et al (US 5,266,284) in view of Knittel (US 3,972,689).

Heilig et al discloses a means of which the direction and amount of diffusion can be controlled by the degree of overlap of a gap and reservoirs, where three housing parts **106**, **102**, **112** with **112** being rotatably disposed with respect to a center part **102**. Heilig et al also discloses a protein solution **107** is situated in a glass cylinder **105** (col 4, ln 30-68). Heilig et al also discloses two recesses **96** are situated in a wall of the center part which borders on a rotating part **112**, this reads on applicant's selection unit, two reservoirs **130**,**132** are disposed in indentations inside the rotating part **112** and a component **122**, this reads on applicant's cover (Fig 14a). Heilig et al also discloses a sealing washer **92** is arranged between the rotating and the center part and the washer has recesses **93** which corresponds to those of **96** in the wall of the center part. Heilig et al also discloses for the crystallization phase, the rotating part is rotated so far the one of the reservoirs comes to be situated completely or partially over the recesses **96** and as a result diffusion can take place from or to a drop of protein solution **107** (col 5, ln 1-55 and

Figs 14-17). Heilig et al also discloses a "hanging drop" method of crystal growth (col 1, ln 15-25).

Heilig et al discloses a reservoir solution and a channel **96**, which allows diffusion to take place when the reservoir are situated over the recesses **96**. Heilig et al does not disclose a device having a first end, a second end, and a discrete diffusion pathway extending from the first end to the second and first end is configured for placement in a well of a plate containing the reservoir solution.

In a method of vapor growing crystals, note entire reference, Knittel teaches a diffusion limiting channel having a fist end, a second end and a discrete diffusion pathway **4** extending from the first end to the second end and the first end of the device configured for placement in a well containing a reservoir solution **5**. The diffusion limiting channel provides the only pathway between a source and a growing crystal. Knittel also teaches the limiting channel can take forms such as a single capillary tube, several capillary tubes or any other shapes **6,7,8**. Knittel also teaches the diffusion limiting channels produces crystal of superior quality and allows improved stoichiometric control. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Heilig et al vapor diffusion device with Knittel's diffusion limiting channel between a source and a growing crystal to grow crystals of superior quality and to improve stoichiometric control.

Referring to claim 2, the combination of Heilig et al and Knittel teach discrete channels **4**.

Referring to claim 4, the combination of Heilig et al and Knittel teach the extent of diffusion can be controlled by the degree of overlap and the rotating part is rotated so far the one

of the reservoirs comes to be situated completely or partially over the recesses, this reads on applicant's actively controlled channel unit.

Referring to claim 5, the combination of Heilig et al and Knittel teach the limiting channels can be fine holes drilled through a plug ('689 col 1, ln 39-45), this reads on applicant's material porous to vapor, where the material is proved to affect vapor diffusion rates.

Referring to claim 14, the combination of Heilig et al and Knittel teach reservoirs **130** and **132,** this reads on applicant's reservoir unit comprising a plurality of reservoir chambers, a plurality of diffusion limiting channel 7, this reads on applicant's channel unit, and a rotating part **112**, this reads on applicant's selection unit with a opening (Figs 14-17) and the rotating part is rotated so far the one of the reservoirs comes to be situated completely or partially over the recesses **96** to control the amount of diffusion (col 4, ln 55 to col 5, ln 45). The combination of Heilig et al and Knittel is silent to the opening is large enough not to control the rate of vapor diffusion. It is inherent to the invention taught by the combination of Heilig et al and Knittel to have an opening large enough not to control the rate of vapor diffusion because opening is as large as the reservoir opening (Fig 14b), therefore can not control the rate of vapor diffusion. Also, the combination of Heilig et al and Knittel teaches the rotating part **112** is rotatable. The combination of Heilig et al and Knittel is silent to the channel unit can rotate. However, the combination of Heilig et al and Knittel teaches the channel unit is a separate housing part, which is inherently capable of being rotated. The combination of Heilig et al and Knittel is not required to have the channel unit rotate, merely the capability of being rotated. The combination of Heilig et al and Knittel is silent to each channel having a different geometry different from each other to provide different diffusion rates. However, the combination of Heilig et al and Knittel teach

other shapes can be used and the cross-sectional area of a capillary tube affects the quality of the crystal. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Heilig et al and Knittel by optimizing the geometry of each capillary tube to obtain same by conducting routine experimentation of a result effective variable (MPEP 2144.05).

Referring to claim 15, the combination of Heilig et al and Knittel teach a cover, **122** (Fig 14a).

Referring to claim 16, the combination of Heilig et al and Knittel silent to the channel unit comprises an opening large enough not to control the rate of vapor diffusion. It is inherent to the invention taught by the combination of Heilig et al and Knittel to have an opening large enough not to control the rate of vapor diffusion because the opening is as large as the reservoir opening, therefore can not control the rate of vapor diffusion (Fig 14b).

Referring to claim 17, the combination of Heilig et al and Knittel teach a sealing washer **92**.

Referring to claim 18, the combination of Heilig et al and Knittel teach the extent of diffusion can be controlled by the degree of overlap and the rotating part is rotated so far the one of the reservoirs comes to be situated completely or partially over the recesses, this reads on applicant's actively controlled channel unit.

Referring to claim 19 the combination of Heilig et al and Knittel teach a solution is situated in a glass cylinder **105**, this reads on applicant's container. A diffusion limiting channel **4**, this reads on applicant's device having discrete diffusion pathways and sealing with O-rings

104, 120 and a sealing washer **92**, this reads on applicant's seal. The combination of Heilig et al and Knittel teach a lid **122** (Fig 14a), which also reads on applicant's seal.

Referring to claim 20, the combination of Heilig et al and Knittel teach a diffusion limiting channel **4,7**, this reads on applicant's discrete channels. (col 5, ln 1-15)

Referring to claim 21, the combination of Heilig et al and Knittel teach two recesses **96** and two reservoir solutions **130, 132.** (col 5, ln 1-15)

Referring to claim 22, the combination of Heilig et al and Knittel teach the extent of diffusion can be controlled by the degree of overlap and the rotating part is rotated so far the one of the reservoirs comes to be situated completely or partially over the recesses, this reads on applicant's actively controlled channel unit.

Referring to claim 23, the combination of Heilig et al and Knittel teach the limiting channels can be fine holes drilled through a plug ('689 col 1, ln 39-45), this reads on applicant's material porous to vapor, where the material is proved to affect vapor diffusion rates.

Referring to claim 28-29, the combination of Heilig et al and Knittel teaches the channel unit is a separate housing part from the first housing part **106**, which is inherently capable of being removable. Furthermore, making elements separable was held to have been obvious (MPEP 2144.04 and In re Dulberg 129 USPQ 148 (CCPA 1961)).

Referring to claims 30-31, 37 and 38, the combination of Heilig et al and Knittel teaches sealing with O-rings **104, 120** and a sealing washer **92** (col 5, ln 1-5).

Referring to claims 33 and 39, the combination of Heilig et al and Knittel is silent to the length of the diffusion channel. The length of a diffusion channel and cross sectional area affect diffusion rate, as evidenced by Roorda et al (US 5,972,369) below. Therefore, it would have

been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Heilig et al and Knittel by optimizing the length of the channel to obtain same by conducting routine experimentation of a result effective variable (MPEP 2144.05). Furthermore, changes in size and shape is held to be obvious (MPEP 2I44.04)

Referring to claim 36, the combination of Heilig et al and Knittel teaches a first end for a growth solution **107**, a second end for a reservoir solution **130, 132**, a cylindrical body extending from the first end to the second end **96** and a diffusion pathway **4**.

3. Claims 24-26, 32, 34, 35 40-41 rejected under 35 U.S.C. 103(a) as being unpatentable over Heilig et al (US 5,266,284) in view of Knittel (US 3,972,689) as applied to claims 1-2, 4-5, 14-23 and 27-31 above, and further in view of Kim et al (US 6,039,804).

The combination of Heilig et al and Knittel teach all of he limitations of claim 24, as discussed previously, except the seal is optically clear.

In a method of hanging drop crystallization of a protein, note entire reference, Kim et al teaches a drop of solution containing the substance to be crystallized to a cover slip **46**, which is inserted into a drop chamber. Kim et al also teaches after the solution is placed in the drop chamber the drop chamber can be sealed by applying a sealant, preferably transparent, adhesive tape (col 4, ln 45-67), this reads on applicant's optically clear. Kim et al also teaches a crystallization tray which includes 24 crystallization units (col 5, ln 55-65). Referring to claim 32, the combination of Kim et al and Knittel teacha hanging drop crystallization by applying drop of solution to a cover slip **46** ('804 col 4, ln 45-65). Knittel teaches a collar **14** adjacent the second end having a width larger than the diameter of the well. It would have been obvious to a

person of ordinary skill in the art at the time of the invention to modify the combination of Heilig et al and Knittel with Kim et al's transparent means of sealing a chamber to observe the crystallization process.

4. Claims 1, 2, 4, 5, 29-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al (US 6,039,804) in view of Knittel (US 3,972,689).

Kim et al discloses a crystallization unit **26** includes a central reservoir **28**, four diffusion channels **30** and four drop chambers **32**.

Kim et al does not disclose a device having a first end, a second end and the first end of the device configured for placement in a well of a plate containing the reservoir solution.

In a method of vapor growing crystals, note entire reference, Knittel teaches a diffusion limiting channel having a fist end, a second end and a discrete diffusion pathway **4** extending from the first end to the second end and the first end of the device configured for placement in a well containing a reservoir solution **5**. The diffusion limiting channel provides the only pathway between a source and a growing crystal. Knittel also teaches the limiting channel can take forms such as a single capillary tube, several capillary tubes or any other shapes **6,7,8**. Knittel also teaches the diffusion limiting channels produces crystal of superior quality and allows improved stoichiometric control. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Kim et al vapor diffusion device with Knittel's diffusion limiting channel between a source and a growing crystal to grow crystals of superior quality and to improve stoichiometric control.

Referring to claims 2 and 20, the combination of Kim et al and Knittel teach several capillary tubes ('689 col 1, ln 35-45), this reads on applicant's discrete channels.

Referring to claims 4 and 22, the combination of Kim et al and Knittel teach diffusion between the reservoir and the drop chambers can be terminated by deposition of a vapor impermeable substrate in the diffusion channel ('804 col 5, ln 15-25), this reads on applicant's channel size can be actively controlled.

Referring to claims 5 and 23, the combination of Kim et al and Knittel teach the limiting channels can be fine holes drilled through a plug ('689 col 1, ln 39-45) and a vapor diffusive reagent may be deposited in the drop chamber to control the crystallization process ('804 col 7, ln 10-20), this reads on applicant's material porous to vapor, where the material is proved to affect vapor diffusion rates.

Referring to claim 19, the combination of Kim et al and Knittel teach a container for holidn a reservoir solution **28**, a device configured fro engaging the container, the device having a first end configured for placement within the container, a second end and a discrete diffusion pathway extending from the first end to the second end **4**, a seal configured to engage the second end, wherein the seal engages the second end; the seal and the second end define a space for crystal growth solution ('804 col 4, ln 45-67).

Referring to claim 20, the combination of Kim et al and Knittel teach a second reservoir solution ('804 Fig 1).

Referring to claims 24-26 and 41, the combination of Kim et al and Knittel teach a drop of solution containing the substance to be crystallized to a cover slip **46**, which is inserted into a drop chamber. Kim et al also teaches after the solution is placed in the drop chamber the drop

chamber can be sealed by applying a sealant, preferably transparent, adhesive tape ('804 col 4, ln 45-67), this reads on applicant's optically clear.

Referring to claim 27-29, the combination of Kim et al and Knittel does not explicitly teach the parts are removable. This is inherent because the combination of Kim et al and Knittel teach a plug ('689 col 1, ln 35-45), which is removable. Furthermore, making elements separable was held to have been obvious (MPEP 2144.04 and In re Dulberg 129 USPQ 148 (CCPA 1961)).

Referring to claims 30-31, 37, the combination of Kim et al and Knittel is silent to an O-ring. However, O-ring are well known in the art to be used as a sealing means in vapor diffusion processes, as evidenced by Heilig et al (US 5,266,284).

Referring to claim 32, the combination of Kim et al and Knittel teacha hanging drop crystallization by applying drop of solution to a cover slip **46** ('804 col 4, ln 45-65).

Referring to claims 33 and 39, the combination of Kim et al and Knittel is silent to the length of the diffusion channel. The length of a diffusion channel and cross sectional area affect diffusion rate, as evidenced by Roorda et al (US 5,972,369) below. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Kim et al and Knittel by optimizing the length of the channel to obtain same by conducting routine experimentation of a result effective variable (MPEP 2144.05). Furthermore, changes in size and shape is held to be obvious (MPEP 2144.04)

Referring to claim 34, the combination of Kim et al and Knittel teaches a collar **14** adjacent the second end having a width larger than the diameter of the well.

Referring to claim 35 and 40, the combination of Kim et al and Knittel teaches a 24 crystallization units **26** ('804 col 5, ln 55-65 and Fig 7).

Referring to claim 36, the combination of Kim et al and Knittel teaches a first depression to provide a space **40**, a second end for placement into a well of a plate, the well containing a reservoir solution **28**, a generally cylindrical body extending from the first end to the second end ('804 Fig 3) and a diffusion pathway **4**.

Response to Arguments

5. Applicant's arguments filed 3/19/2004 have been fully considered but they are not persuasive.

Applicant's argument that Knittel does not teach a device having a first end, a second end and a discrete diffusion pathway extending from the first end to the second end is noted but is not found persuasive. Applicant alleges that the constricting channel **4** does not extend from the first end to the second of the device because the tube **1** is 15 cm long and the channel is about 5 cm from the bottom of the tube. The device instantly claimed by applicant merely is required to have a first end, a second end and a discrete diffusion pathway extending from the first end to the second end and the first end is configured for placement in a well of a plate containing a reservoir solution. The diffusion limiting channel taught by Knittel reads on applicant's device because it has a first end, a second end and a discrete diffusion pathway extending from the first end to the second end. Applicant's have incorrectly required the device to be the tube **1** and thus incorrectly require the channel **4** to extend from the first end to the second end of the tube **1.**

Applicant's argument that Knittel does not teach the first end of the tube being configured for placement in a well of a plate containing the reservoir solution is noted but is not found persuasive. As stated above, the diffusion channel **4** itself reads on applicant's device not

the tube **1**. The recesses **96** in the device taught by Heilig et al used in the crystallization process from the reservoirs **130,132** can be modified by using the diffusion limiting channel of Knittel. Furthermore, the first end of the device is merely configured for placement in a well of a plate containing the reservoir solution. The diffusion limiting channel is capable of being placed in the well of plate; therefore meets the claim.

Applicant's argument that the combination of Heilig et al and Knittel does not teach the channels have a geometry different from each other channel to provide a different diffusion rate is noted but is not found persuasive. The geometry of the channel is taught by Knittel to affect the quality of the crystal and circular or other shapes can be used (col 1, ln 35-55). Therefore, It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Heilig et al and Knittel by optimizing the geometry of each capillary tube to obtain same by conducting routine experimentation of a result effective variable (MPEP 2144.05).

In response to applicant's argument that the combination of Heilig et al and Knittel does not teach the geometry is different to provide a different diffusion rate, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). The combination of Heilig et al and Knittel teach the geometry of the channel affects the quality of the crystal and circular or other shapes can be used ('689 col 1, ln 35-55).

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Roorda et al (US 5,972,369) teaches a capillary channel has a cross sectional area and a length selected to deliver material at a predetermined rate (col 2, ln 15-25).

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J Song whose telephone number is 571-272-1468. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Matthew J Song
Examiner
Art Unit 1765

MJS

NADINE G. NORTON
SUPERVISORY PATENT EXAMINER